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Multiple reflections in backscattering by a single scatterer near a perfectly reflecting surface

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Abstract

The scattering of a plane electromagnetic wave by a solitary scatterer randomly positioned near a perfectly reflecting surface is investigated in the dipole approximation taking into account infinite multiplicity of scattering. It is shown that the presence of multiply reflected waves increases the "effective" polarizability of the particle and adds another component of the dipole moment along the normal to the surface. As a result, the backscattering enhancement effect becomes stronger, and the angle of incidence at which amplification of the p-polarized wave vanishes becomes smaller. The influence of multiply scattered waves increases as the particle approaches the boundary in this case.